rotted internally, are as tender as blotting-paper, and will scarcely bear damping without the hair and epidermis peeling off. Skins so stuffed are very liable to injury in carriage from place to place. It is this style of stuffing that makes me feel certain they could not have been prepared far inland; for no one would have adopted such an inconvenient and dangerous practice if the skins had to be carried for many miles on the backs of men; and even near the coast it would have been better if the skins had been spread out flat and allowed to dry on both sides, and then had been packed in a small space, as is usual with good collectors. The plan adopted, and the want of sufficient attention afterwards, render his specimens of the larger Mammalia of little value for a museum. Thus the beautiful Antelope (*Tragelaphus euryceros*) has no hoofs, and only remnants of ears and tail. The Buffalo skins want hoofs and tail, and one has no horns; and many of the other skins are equally imperfect, and cannot be stuffed.

The smaller specimens of the Mammalia are in a better state; but many of these, from constant handling and want of care, are without one or more limbs, &c. And I may observe that the *Galago*, smaller monkeys, and some of the squirrels are preserved just as they are usually sent from the native collector, with a stick up their tail, and not as if they had been preserved by a collector who had received instructions in taxidermy from M. Verreaux at Paris.

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY.

March 21, 1861.—Major-General Sabine, Treasurer and Vice-President, in the Chair.

"On the Structure and Growth of the Tooth of *Echinus*," by S. James A. Salter, M.B. Lond., F.L.S., F.G.S.

The author commences his paper by stating that the researches upon which it is based were made more than four years since, and then without the knowledge that the structure had been previously investigated by others.

An abstract of the *literature* of the subject (contained in very narrow limits) is then given.

In 1841 Valentin, in Agassiz's Monograph on the Echinoderms (*Anatomie des Echinodermes*), published a description and many good figures of the minute anatomy and growth of the Echinus-tooth.

Professor Quekett, in his 'Lectures on Histology' (1854), referring to the minute *mature* anatomy of the organ, states its ultimate structure to resemble bone and dentine of vertebrata.

Dr. Carpenter, in his work 'On the Microscope,' speaks of the tissue of the tooth as essentially of the same nature as the shell of the Echinidæ generally (1856).

Lastly, Professor W.C. Williamson describes the subject more fully

than his predecessors, entering into the question of the development of the tooth both generally and histologically (though apparently in ignorance of Valentin's Essay), in a paper on the "Histology of the Dermal Tissues," &c., in the British Journal of Dental Science, 1857.

The coarse anatomy and relations of the Echinus-tooth are then described, and the question is discussed as to how far the organ resembles and how far it does not resemble the incisor tooth of a Rodent mammal, to which it has constantly been likened.

Some remarks then follow on the method of investigation, which the peculiar physical characters of the structure render very difficult.

Before describing the histology of the mature tooth, the author premises some succinct remarks upon the several elementary parts that are formed at its growing extremity, and by which its complex structure is built up—showing how the shape and plan of these elements determine the microscopical appearances of the several regions of the tooth as seen in different sections.

These elementary parts are—(1st) the *Primary plates*, which consist of a double series of triangular sheets of calcareous matter, and which constitute the physiological axis of the tooth, about which, and connected with which, the four secondary elements are developed. These latter are (2nd) the *Secondary plates*, lappets of similar calcareous sheets attached to the outer edge of the primary plates; (3rd) the *Flabelliform processes*, elaborate reticulations of calcareous fibres ending in fan-shaped extremities; (4th) the *Keel fibres*, certain long cylindrical rods with club-shaped ends of the same chemical nature, which pass towards the enteric region of the tooth in their growth; and (5th) the *Enamel Rods*, which are minute very short developments of the same character, and which are formed in the opposite direction. Thus far a primary and secondary stage of formation are represented: a third stage, that of consolidation, now occurs in the development of (6th) the *Soldering particles*, multitudes of minute disks of carbonate of lime which appear over the whole surface of the previously-formed elementary parts, and by which they are soldered together, the intervals between these (in a certain sense) constituting the tubular character of the mature tissue.

The primary plates, secondary plates, and the proximal portion of the flabelliform processes are stated to constitute the body of the tooth; the distal extremities of the flabelliform processes the *skirtings* of the enteric region of the body of the tooth; the keel fibres wholly form the keel; while the short enamel rods compose the thin white layer on the dorsal surface of the tooth—the enamel.

The histology of the tooth is remarkable as exhibiting apparent inconsistencies in different lines of section. A vertical section of the tooth presents the appearance of vertebrate bone—lacunæ, canaliculi, and lamellæ; while a transverse section displays some regions resembling dentine (the body of the tooth), and others having the closest similitude to an oblique section of the shell of some Mollusca, such as *Pinna*.

The author then proceeds to describe in detail and with particularity the form and progressive growth of the several elements of the tooth

as they are met with in examining the growing extremity and proceeding from it towards the mature structure, as long as the elements are susceptible of isolation and individual examination. The anatomy of the soldering particles, and their relation to the production of the cavitary structure of the tooth, is specially dwelt upon. The soldering particles are supposed to be isolated at first, but as they enlarge they become connected by a thin film from their upper and under faces. This occurs before the final consolidation of the tissue, and before the soldering particles are indissolubly connected with, and themselves indissolubly connect, the contiguous elements of the tooth. At this stage these particles are still susceptible of isolation, and they may be separated *en masse*, being held in relative position by the films that connect them. The soldering particles and the connecting films thus constitute a tubular system, which has an independent existence before the final consolidation of the tissue; and this tubular system is introduced between, and interpolated among the previously existing elementary parts of the tooth.

The author concludes by expressing a coincidence of opinion with Dr. Carpenter, that the minute structure of the tooth is essentially of the same nature as that of the shell of the Echinidæ generally.

ZOOLOGICAL SOCIETY.

February 12, 1861.—John Gould, Esq., F.R.S., V.P., in the Chair.

Observations on the Anatomy of the Echinoderms. By Thomas Howard Stewart, M.R.C.S., F.Z.S.

There are certain points connected with the anatomy of the Echinoderms which I am anxious to lay before the Society; and the more especially do I desire to do so, as I am not able to find any true and accurate description existing of the very wonderful apparatus for the prehension and division of food, which some of the higher groups of this class possess. I mean higher groups with regard to the class itself. The animals forming this class, from their organization, are placed low in the scale of creation, being just above the Polypifera and below the Annelida; yet we shall find, in the order *Echinoidea* of this class, animals possessing what may be called a *splanchnic* or oral skeleton, of so complicated and yet so efficient an arrangement, as cannot fail to make us wonder at the object of its sudden appearance in the anatomy of animals; nor can we help admiring the beauty, and wondering at the perfection of the work. Those who have not searched into the anatomy of these lower forms of life might be surprised to be told that a creature just above the common Sea-anemone, with an almost invisible nervous system, and otherwise very low organization, possesses jaws (or, as I prefer to call the apparatus, a splanchnic skeleton) of a more complicated arrangement than any other animal in existence, from a simple sponge or *Amœba* up to man himself. This splanchnic skeleton, in *Cidaris*, *Echinus*, and allied genera, is formed of forty separate calcareous portions, arranged in a conical form, and, as we shall see by de-